

What is claimed is:

1. A method of polymerizing a composition containing a free radical photoinitiator,
5 ~~comprising~~ the sequential steps of:

(a) exposing the composition to a first radiation source having a maximum
spectral output occurring at a wavelength of greater than 300 nm; and

10 (b) thereafter exposing the composition to a second radiation source having a
maximum spectral output occurring at a wavelength of less than 300 nm.

2. A method as defined in claim 1, wherein said composition is a free radically
polymerizable composition.

15 3. A method as defined in claim 2, wherein said composition further comprises:

(a) about 50-100 parts by weight of at least one acrylic acid ester of an alkyl
alcohol, said alcohol containing from 1 to 18 carbon atoms; and

20 (b) about 0-50 parts by weight of at least one copolymerizable monomer.

4. A method as defined in claim 1, wherein said second radiation step has a fluence
rate of greater than about 2 mW/cm².

25 5. A method as defined in claim 1, further comprising the step of applying the
composition to a substrate before exposing the composition to said first radiation source.

30 6. A method as defined in claim 5, wherein said substrate comprises at least one of
paper, polymeric film, metal foil, woven cloth, or nonwoven cloth.

7. A method as defined in claim 5, further comprising the step of polymerizing the composition to at least 10% conversion before the composition is applied to said substrate.

8. A method as defined in claim 1, wherein the step of at least exposing the composition to said first radiation source is conducted in an inert environment wherein the concentration of oxygen is less than about 1000 ppm.

9. A method as defined in claim 8, wherein the composition is covered by a transparent film before being exposed to said first radiation source to create said inert environment.

10. A method as defined in claim 1, wherein said photoinitiator comprises less than about 5 percent of the composition total weight.

11. A method as defined in claim 1, wherein the photoinitiator comprises 2,2-dimethoxy-1,2-diphenylethan-1-one.

*absorb peak
330-340 nm*

12. A method as defined in claim 1, wherein the composition includes a combination of at least two different photoinitiators.

13. A method as defined in claim 1, wherein exposure of the composition to said first radiation source results in at least about 20% completion of the polymerization reaction, and exposure of the composition to said second radiation source results in at least about 95% completion of the polymerization reaction.

14. A method as defined in claim 1, wherein exposure of the composition to said first radiation source results in at least about 75% completion of the polymerization reaction, and exposure of the composition to said second radiation source results in greater than about 95% completion of the polymerization reaction.

15. A method as defined in claim 1, wherein the composition includes acrylate monomers.

16. A method as defined in claim 15, wherein said acrylate monomer comprises at least about 30% of the composition total weight.

17. A method as defined in claim 1, wherein the composition includes a crosslinking agent.

18. A method as defined in claim 17, wherein the crosslinking agent is a triazine, benzophenone, or a substituted benzophenone.

19. A method as defined in claim 17, wherein the crosslinking agent is a trihalomethyl-s-triazine.

20. A tape including a pressure sensitive adhesive prepared using the method of claim 1.

21. A method of polymerizing a composition containing a free radical photoinitiator, comprising the sequential steps of:

(a) exposing the composition to a first radiation source comprising wavelengths ranging from about 315 nm to 500 nm; and

(b) thereafter exposing the composition to a second radiation source comprising wavelengths ranging from about 200 nm to 280 nm.

22. The method as defined in claim 21, wherein at least 90% of the actinic output from said first radiation source falls within a wavelength range from 315 nm to 400 nm.

23. The method as defined in claim 21, wherein at least 90% of the actinic output from said second radiation source falls within a wavelength range from 200 nm to 280 nm.

5 24. A method of polymerizing a composition containing a free radical photoinitiator, comprising the sequential steps of:

(a) exposing the composition to a first radiation source, said first radiation source comprising at least one of an incandescent lamp and a fluorescent lamp; and

4181752

10 (b) thereafter exposing the composition to a second radiation source, said second radiation source comprising at least one of a low pressure mercury arc lamp, an excimer lamp, and an excimer laser.

15 25. The method as defined in claim 24, wherein the fluence rate of the first radiation step is less than about 50 mW/cm².

4181752

20 26. The method as defined in claim 24, wherein the fluence rate of the second radiation step is greater than 2 mW/cm².